

WHAT IS CLAIMED IS:

1. A stage apparatus comprising:

a first-direction guide which extends in a first direction and can move in a second direction

5 perpendicular to the first direction;

a first driving mechanism which moves said first-direction guide in the second direction;

a movable body which can be guided by said first-direction guide to move in the first direction;

10 and

first electromagnetic force generating means which generates an electromagnetic force in the second direction between said movable body and said first-direction guide to keep said movable body and
15 said first-direction guide in noncontact with each other.

2. The apparatus according to claim 1, wherein said first electromagnetic force generating means includes an electromagnet provided to said movable body to
20 oppose a guide surface of said first-direction guide, and an attracting plate provided along the guide surface.

3. The apparatus according to claim 1, further comprising a fine movement stage which is loaded on
25 said movable body and can control displacement at least in the second direction.

4. The apparatus according to claim 3, wherein said

fine movement stage is controlled by the Lorentz force in 6-axis directions including the first direction, the second direction, a third direction perpendicular to the first and second directions, and rotations about
5 axes of the first to third directions.

5. The apparatus according to claim 1, further comprising a second driving mechanism which moves said movable body in the first direction with a linear motor provided on said first-direction guide.

10 6. The apparatus according to claim 1, further comprising

a second-direction guide which extends in the second direction and can move in the first direction, and

15 a second driving mechanism which moves said second-direction guide in the first direction,

wherein said movable body is provided at an intersection of said first- and second-direction guides and can be guided in the first and second directions to
20 move in the first and second directions, and

said first electromagnetic force generating means further generates an electromagnetic force in the first direction between said movable body and said second-direction guide to keep said movable body and
25 said second-direction guide in noncontact with each other.

7. The apparatus according to claim 6, further

comprising second electromagnetic force generating means for generating an electromagnetic force in a third direction perpendicular to a plane including the first and second directions, either between said first-direction guide and said movable body or between said second-direction guide and said movable body.

8. The apparatus according to claim 6, wherein said first and second driving mechanisms comprise iron-core moving-magnet linear motors.

9. The apparatus according to claim 1, further comprising:

a first-direction guide position measuring unit which measures position of said first-direction guide in the second direction; and

a movable body position measuring unit which measures position of said movable body in the second direction.

10. The apparatus according to claim 9, wherein said first-direction guide position measuring unit measures rotational component of said first-direction guide, and said movable body position measuring unit measures rotational component of said movable body.

11. A method of controlling a stage apparatus, comprising:

a driving step of moving a first-direction guide, which extends in a first direction and can move in a second direction perpendicular to the first direction,

in the second direction;

a first control step of controlling at least a pair of electromagnets, which generate electromagnetic forces in opposite directions along the second

5 direction between a movable body, which can be guided in the first direction guide to move in the first direction, and the first-direction guide, to keep the movable body and the first-direction guide in noncontact with each other; and

10 a second control step of controlling driving of the electromagnets, in response to movement of the first-direction guide in the second direction by the driving step, to apply an accelerating force in the second direction to the movable body.

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